

**MULTI-DISPLAY SYSTEMS****CROSS-REFERENCE TO RELATED APPLICATIONS**

The present invention is related to that disclosed in U.S. Provisional Patent Application No. 60/056,825, filed on Aug. 22, 1997, entitled "MULTI-SIDED INTERACTIVE DISPLAY SYSTEM" which is commonly assigned to the assignee of the present invention. The disclosure of this related provisional patent application is incorporated herein by reference for all purposes as if fully set forth herein.

**TECHNICAL FIELD OF THE INVENTION**

The present invention is directed, in general, to display systems and, more specifically, to interactive, disassemblable, portable multi-display systems.

**BACKGROUND OF THE INVENTION**

Conventional large-screen display systems are used in a multitude of public venues, including exhibition halls, department stores, convention centers, trade-shows and sports arenas. At one end of the size scale, these display systems may be large cathode ray tube devices, such as 40 or more-inch screen televisions. At another end of the size scale, these displays may be either rear projection screens or large video displays consisting of many pixel elements arranged in a large, flat-panel array.

Two of the better known large-screen video display systems are the Sony JUMBOTRON® screen and the Mitsubishi DIAMOND VISION® screen. These display systems may include displays of various sizes. For example, some of the standard screen sizes and weights for the JTS-17 JUMBOTRON® units are 8'x11'—3,000 lbs., 12'x16'—7,000 lbs., and 16'x22'—12,500 lbs. Some of the standard screen sizes and weights for the JTS-35 JUMBOTRON® units are 12'x16'—7,000 lbs., 16'x22'—12,500 lbs., 20'x27'—19,000 lbs., and 24'x33'—28,000 lbs. The depth of these screens is about 15 inches. The images displayed on these devices are viewable through about a 120-degree range.

Despite their increasing prevalence, large display systems frequently suffer a number of drawbacks. The flat screen video systems, such as the JUMBOTRON® and DIAMOND VISION® screens are heavy, bulky, prohibitively expensive, require specialized installation, require cooling, and may have a somewhat limited viewing range. They also are not easily disassembled, or portable, or are at least very expensive and difficult to transport.

Large-screen televisions also have a number of drawbacks. Like the flat screen video displays, current large-screen tube televisions are heavy and bulky. There is also a practical limit to the size of a large-screen television due to manufacturing limitations associated with the cathode ray tube in a large-screen television. Large-screen televisions are expensive and are not readily transportable, since the largest element in a large-screen television, the cathode ray tube, cannot be disassembled.

Large screen televisions are currently also manufactured using rear screen projection technology. In projection televisions a projector is located at the front bottom portion of the unit and a mirror is placed at the rear portion of the unit to reflect the image onto a rigid fresnel screen. Similar to large screen tube TVs the current state of the art in these projection devices are really non-portable, heavy, and have screen sizes up to approximately 200" diagonal (also known as "retro boxes").

The problems associated with large-screen televisions and large, flat-screen video displays are exacerbated when the devices are used in a multi-sided display system (also called a "multi-display system"), such as one having three or more sides, with a viewable display on each side. The cost, weight and portability problems of a single flat-screen video display or cathode ray tube device are multiplied accordingly in a multi-sided display system.

There is therefore a need in the art for improved multi-sided display systems that do not suffer from the cost, weight and portability problems inherent in the prior art. In particular, there is a need for an improved large-screened multi-display system that is light-weight relative to the current art, and easily transportable, that uses a minimal amount of construction materials, and that may be rapidly installed in either a permanent or temporary location. In particular, there is a need in the convention/venue art for a temporary, quickly assembled, installed, removed and disassembled interactive multi-display system that is capable of operating independently as well as under the control of an operator.

**SUMMARY OF THE INVENTION**

To address the above-discussed deficiencies of the prior art, the present invention provides an interactive, disassemblable, portable multi-display system for displaying images. An exemplary multi-display system, that may be associated with an audio system, includes a multi-sided structure capable of forming a plurality of viewable images, that may, for instance, include two or more image projectors, or, in alternate embodiments, a plurality of flat panel displays, or the like (collectively, along with the image projectors, "image generating means").

According to one advantageous embodiment incorporating the image projectors, the structure forms an enclosure wherein at least two of the sides have light transmissive portions. The image projectors may advantageously be disposed within the enclosure for projecting their respective image beams on the light transmissive portions of the sides. Two or more of the image beams produce viewable images on the light transmissive portions. In a related embodiment, at least a portion of each of these image beams intersect without causing interference to one another.

An important aspect of this multi-display system is that it is relatively inexpensive, light-weight, portable and disassemblable as compared to the above-described systems of the prior art. This is particularly important in the convention/venue art where a temporary, quickly assembled, installed, removed and disassembled multi-display system is needed. For instance, the multi-display system may be comprised of lightweight, flexible materials—for instance, the sides (or surfaces thereof) may be comprised of masonite, paperboard, foam core board, styrene, expanded PVC foam, vinyl, cotton, or other suitable cloth or other suitable material, or combination thereof.

In one advantageous embodiment, the multi-sided structure is defined by a substantially inflexible frame that mechanically, or, more broadly, physically, cooperates with the plurality of sides to form the enclosure. For the purposes here of, the term "structure," and its derivatives, are defined broadly as the sum total of the structural features of the multi-display system, or relevant portion thereof—in other words, the arrangement or interrelation of the various parts comprising the multi-display system, or the relevant portion; the term "or" is defined as inclusive, meaning and/or; the term "frame," and its derivatives, may be defined as any load